

CLAIMS

1. A drug nanoparticle obtained by irradiating laser beam to a solid target composed of drug powder so as to release the drug as nanoparticles from the solid target, wherein said drug nanoparticles have an average diameter of 100 nm or less.

2. The drug nanoparticles according to Claim 1, wherein said drug is composed of organic compound.

3. A drug-protein nanocomposite obtained by irradiating laser beam to a solid target composed of a mixture of drug powder and protein so as to release the drug and the protein as nanocomposites from the solid target, wherein each of drug nanoparticles and protein nanoparticles constituting the nanocomposites have an average diameter of 100 nm or less.

4. The drug-protein nanocomposite according to Claim 3, wherein said drug is composed of an organic compound.

5. A method of manufacturing a medical agent, comprising the steps of:
irradiating a laser beam to a solid target composed of drug components under an inert gas atmosphere of reduced pressure, and breaking intermolecular bonds of said drug components thereby to release said drug as nanoparticles;
generating nanoparticles having an average diameter of 100 nm or less; and
depositing said nanoparticles onto a surface of excipient particles.

6. A method of manufacturing a medical agent, comprising the steps of:

irradiating a laser beam to a solid target composed of drug components and protein under a reduced pressure of inert gas atmosphere, and breaking intermolecular bonds between said drug components and said protein thereby to release said drug and said protein as nanocomposites;

5 generating nanoparticles of the drug and the protein each having an average diameter of 100 nm or less; and

 depositing said nanoparticles as nanocomposites onto a surface of excipient particles.

10 7. The method of manufacturing a medical agent according to Claim 5 or 6, wherein said average diameter of the generated drug nanoparticles is controlled by adjusting species and pressure of said inert gas atmosphere.

8. The method of manufacturing a medical agent according to Claim 5, wherein
15 said solid target is prepared by pressing the drug powder and simultaneously heating the drug powder to a temperature lower than a melting point of the drug powder.

9. The method of manufacturing a medical agent according to Claim 5, wherein said solid target is prepared by a method comprising the steps of:

20 pressing the drug powder and simultaneously heating the drug powder to a temperature immediately below the melting point of the drug powder so as to melt a part of said drug powder; and

 rapidly cooling and solidifying the molten drug thereby to prepare the solid target.

25 10. A medical agent manufacturing apparatus comprising:

a solid target composed of drug powder;

a laser generating equipment for irradiating laser beam to said solid target so that intermolecular bonds of drug components are broken and the drug components are released from said target;

5 a drug container for generating nanoparticles, having an average diameter of 100 nm or less, from said released drug components and for depositing said nanoparticles onto a surface of excipient particles; and

a vacuum chamber for accommodating the solid target and said drug container.

10 11. The medical agent manufacturing apparatus according to Claim 10, further comprising a vibrating device for applying vibration to said excipient particles to which said nanoparticles generated from said solid target are deposited, so that said nanoparticles deposited to said excipient particles are fluidized.

15 12. The medical agent manufacturing apparatus according to Claim 10, wherein said solid target contains protein.